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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/536,697	05/27/2005	Robert Mark Stefan Porter	282546US8XPCT	2286

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EXAMINER	
REDDING, THOMAS M	
ART UNIT	**PAPER NUMBER**
2624	

NOTIFICATION DATE	DELIVERY MODE
01/10/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/536,697	PORTER ET AL.	
	Examiner	Art Unit	
	Thomas M. Redding	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 May 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *5/27/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The abstract of the disclosure is objected to because it contains a title, "Face Detection", and also contains extraneous text at the bottom referring to figures "Figure 13a to 13c". Correction is required. See MPEP § 608.01(b) and 37 CFR 1.72 (b).

> **A brief abstract of the technical disclosure in the specification must commence on a separate sheet, preferably following the claims, under the heading "Abstract" or "Abstract of the Disclosure." The sheet or sheets presenting the abstract may not include other parts of the application or other material. The abstract in an application filed under 35 U.S.C. 111 may not exceed 150 words in length. The purpose of the abstract is to enable the United States Patent and Trademark Office and the public generally to determine quickly from a cursory inspection the nature and gist of the technical disclosure. (37 CFR 1.72 (b))**

2. The specification in its current form is without section headings for the Background of the Invention, Brief Summary of the Invention, Brief Description of the Drawings and the Detailed Description of the Invention. The examiner suggests that the applicant update the specification to conform to customary US practice. See MPEP § 608.01(c-g).

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV, reads as follows:

> Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited to music, literary works and a compilation or mere arrangement of data.
>
> When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare In re Lowry, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994) (claim to data structure stored on a computer readable medium that increases computer efficiency held statutory) and Warmerdam, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in memory held statutory product-by-process claim) with Warmerdam, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory).
>
> In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowry, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

Claims 12-14 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claim 12 defines computer software embodying functional descriptive material. Claim 13 defines a medium providing program code embodying functional descriptive material. Claim 14 defines a storage medium embodying functional descriptive material. However, the claims do not define a computer-readable medium or computer-readable memory and are thus non-statutory for that reason (i.e., "When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized" – Guidelines Annex IV). The scope of the

presently claimed invention encompasses products that are not necessarily computer readable, and thus NOT able to impart any functionality of the recited program. The examiner suggests amending the claim(s) to embody the program on "computer-readable medium" or equivalent; assuming the specification does NOT define the computer readable medium as a "signal", "carrier wave", or "transmission medium" which are deemed non-statutory (refer to "note" below). Any amendment to the claim should be commensurate with its corresponding disclosure.

Note:

"A transitory, propagating signal ... is not a "process, machine, manufacture, or composition of matter." Those four categories define the explicit scope and reach of subject matter patentable under 35 U.S.C. § 101; thus, such a signal cannot be patentable subject matter." (In re Petrus A.C.M. Nuijten; Fed Cir, 2006-1371, 9/20/2007).

Should the full scope of the claim as properly read in light of the disclosure encompass non-statutory subject matter such as a "signal", the claim as a whole would be non-statutory. In the case where the specification defines the computer readable medium or memory as statutory tangible products such as a hard drive, ROM, RAM, etc, as well as a non-statutory entity such as a "signal", "carrier wave", or "transmission medium", the examiner suggests amending the claim to include the disclosed tangible computer readable media, while at the same time excluding the intangible media such as signals, carrier waves, etc.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 15 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claim 15 as a whole defines a transmission medium and "[a] transitory, propagating signal ... is not a "process, machine, manufacture, or composition of matter." Those four categories define the explicit scope and reach of subject matter patentable under 35 U.S.C. § 101; thus, such a signal cannot be patentable subject matter." (In re Petrus A.C.M. Nuijten; Fed Cir, 2006-1371, 9/20/2007).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 2, 4, 6, 8-11 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jones et al. (US 7,099,510).

Regarding claims 1, 11 and 16, Jones discloses a [f]ace detection apparatus ("the object detector of the present invention detects objects (e.g., faces) at any scale and location", Jones, column 2, line 36) generating an output indicative of the likelihood of test regions of a test image containing a face, the apparatus comprising:

means operable to compare a test region with face data indicative of the presence of a face in such a way as to detect plural respective likelihood values indicative of the likelihood of the test region containing a face of a group of respective different face sizes ("Using a cascaded approach, the present invention quickly determines if a face could potentially appear at a given scale and location", Jones, column 2, line 53 and "The summation function includes a global threshold that determines whether or not a sum of the summation function indicates a detection of one of the instances of the certain object in the given subwindow", Jones, column 4, line 32, Jones calculates values for given classification scenarios); and

control means, responsive to metadata associated with the image defining one of a set of predetermined classifications of the image, for modifying the group and/or the likelihood values in dependence upon a face size or range of face sizes appropriate to the classification of that image ("This approach of the invention allows the object detector to discard quickly subwindows that do not show enough features of the object and to continue to process through the cascade only those subwindows that have

enough features that indicate the likelihood of an instance of the object in the subwindow", Jones, Column 2, line 60, The output from the previous stage affects the evaluation of subsequent stages).

Regarding claim 2, Jones teaches an [a]pparatus according to claim 1, in the control means is operable to weight the likelihood values so as to enhance the detected likelihood of a face of a size appropriate to the classification of that image ("the present invention quickly determines if a face could potentially appear at a given scale ... ", Jones, column 2, line 53 and "The object detector scales the homogenous classification functions respectively for each different size of the working window", Jones, column 3, line 56).

Regarding claim 4, Jones teaches an [a]pparatus according to claim 1, comprising means for detecting whether the likelihood value indicative of the greatest likelihood exceeds a threshold likelihood value ("The summation function includes a global threshold that determines whether or not a sum of the summation function indicates a detection of one of the instances of the certain object in the given subwindow", Jones, column 4, line 32).

Regarding claim 6, Jones teaches an [a]pparatus according to claim 1, in which the comparing means is operable:

to derive a set of attributes from respective blocks of the region ("Each of the homogenous classification functions in sequence in the cascade respectively has increasing accuracy in identifying the certain objects. A homogenous classification function consists of a number of features", Jones, column 3, line 41);

to compare the derived attributes with attributes indicative of the presence of a face value; and to derive a probability of the presence of a face by a similarity between the derived attributes and the attributes indicative of the presence of a face ("The summation function includes a global threshold that determines whether or not a sum of the summation function indicates a detection of one of the instances of the certain object in the given subwindow", Jones, column 4, line 32).

Regarding claim 8, Jones teaches a [v]ideo conferencing apparatus comprising apparatus according to claim 1 ("Knowledge of the location and scale of a face can be used in teleconferencing applications as well", Jones, column 3, line 10).

Regarding claim 9, Jones teaches a [s]urveillance apparatus comprising apparatus according to claim 1 ("A face detector based on the present invention can also play a central role in security camera applications. Such a face detector may be used to summarize many hours of airport surveillance tape into a single web page that shows a picture of each person that passed through a security checkpoint", column 3, line 15))

Regarding claim 10, Jones teaches a [d]isplay apparatus comprising: a display screen; a video camera; and apparatus according to claim 1; the video camera and the face detection apparatus being arranged with respect to the display screen so as to detect faces of those looking at the display screen ("The present invention can be used in real-time applications in which the appearance of an object can be used to drive a user interface. For example, an object detector for faces (i.e., face detector) that is designed in accordance with the present invention functions in a kiosk like those used in bank ATM's (automatic teller machines) or airport ticketing machines to identify faces in a real-time application", Jones, column 3, line 4).

Claims 3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jones et al. (US 7,099,510) in combination with Daly et al. (US 6,173,069).

Regarding claim 3, Jones teaches an [a]pparatus according to claim 1.

Jones does not teach in which the control means is operable to select a subset of the group of different face sizes for the testing of the test region, the subset being dependent upon a face size or range of face sizes appropriate to the classification of that image.

Daley, working in the same field of endeavor of face detection does teach select[ing] a subset of the group of different face sizes for the testing of the test region,

the subset being dependent upon a face size or range of face sizes appropriate to the classification of that image ("In most video telephone applications the head is usually centrally located in the upper third of the image. Moreover, the size of the face is usually within a range of sizes and thus candidate circles that are exceedingly small or excessively large are not suitable", Daly, column 7, line 45).

It would have been obvious to one of ordinary skill in the art to use the teaching of Daly to select a sub-set of possible face positions and sizes with the face detection system of Jones in order to use the "implicit characteristics [of video teleconferencing devices] that may be exploited to further determine the appropriateness of candidate circles" (Daly, column 7, line 43). Imposing these limits also reduce the amount of computation required to analyze a scene.

Regarding claim 5, the combination of Jones and Daly teaches Apparatus according to claim 1, in which:

the image is part of a video sequence; and the predetermined classifications include video programme types ("In most video telephone applications the head is usually centrally located in the upper third of the image. Moreover, the size of the face is usually within a range of sizes and thus candidate circles that are exceedingly small or excessively large are not suitable", Daly, column 7, line 45, Daly teaches that context as determined by the subject matter of the video source can be used to improve face detector performance).

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jones et al. (US 7,099,510) in combination with Moghaddam et al. (IEEE, TPAMI Vol 19, 1997).

Regarding claim 7, Jones teaches an [a]pparatus according to claim 6.

Jones does not teach in which the attributes comprise the projections of image areas onto one or more image eigenblocks

Moghaddam, working in a similar problem solving area of face recognition does teach attributes that comprise the projections of image areas onto one or more image eigenvectors ("we must incorporate the underlying probability distribution of the object. Subspace methods and eigenspace decompositions are particularly well-suited to such a task", Moghaddam, page, 696, Section 1.1, first paragraph).

It would have been obvious at the time the invention was made for one of ordinary skill in the art to use the eigen-space method as taught by Moghaddam in the face detection system of Jones to implement a face recognizer that can provide a compact and parametric description of the object's appearance and also automatically identify the degrees-of-freedom of the underlying statistical variability (Moghaddam, page 697, first paragraph). It would be an additional classification method to add to Jone's cascade of classifiers.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas M. Redding whose telephone number is (571) 270-1579. The examiner can normally be reached on Mon - Fri 7:30 am - 5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on (571) 272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/TMR/

VIKKRAM BALI
PRIMARY EXAMINER